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In vivo effects of brown tide on the feeding function of the gill of the northern quahog Mercenaria Mercenaria (Bivalvia: Veneridae)

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Abstract

The in vivo response of adult northern quahogs, Mercenaria mercenaria, to Aureococcus anophagefferens (brown tide) at the level of the gill was determined using video-endoscopy. Feeding activity, particle-approach velocities, and ventral-groove-transport velocities were documented after the quahogs were exposed to Isochryis galbana (baseline observations) supplemented with either toxic or nontoxic A. anophagefferens at two bloom concentrations (8×10^5 or 2×10^6 cells ml^{-1}). Externally, there was no evidence of adverse effects of brown tide on feeding, as siphons remained extended and dilated. Toxic brown tide at both concentrations elicited gill muscular contractions, intermittent cessation of water flow, and decreased particle loading within the pallial cavity. The 8×10^5 cell ml^{-1} toxic treatment had no significant effect on approach velocities or ventral-groove-transport velocities after 2 h, although timeaveraging showed significant reduction of the latter during the last 30 min of exposure. The higher concentration of toxic brown tide caused a significant decrease in these velocities after only 1 h. Nontoxic brown tide produced none of these effects. Thus, A. anophagefferens compromised quahog feeding by stimulating contractions of the branchial musculature and interfering with lateral and ventral groove ciliary beating. These effects were both timeand concentration-dependent and could be caused by either a dopaminergic or a serotonergic toxic factor. © 2010 Marine Biological Laboratory.

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Water Pollutants